

# LC 220, LC 221

Service instructions



## English (GB) Service instructions

Original service instructions.

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## 1. Symbols used in this document

**Warning**

*If these safety instructions are not observed, it may result in personal injury.*

**Warning**

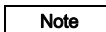
*If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.*

**Warning**

*These instructions must be observed for explosion-proof versions. We recommend that you also follow these instructions for standard versions.*



*If these safety instructions are not observed, it may result in malfunction or damage to the equipment.*



*Notes or instructions that make the job easier and ensure safe operation.*

## 2. Safety

**Warning**

*Work in or near pits must be carried out according to local regulations.*

Sumps and pits for submersible wastewater pumps may contain gasses and wastewater with toxic and/or disease-causing substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing, and all work on and near the pump must be carried out under strict observance of hygienic regulations.

**Warning**

*Always lift the pump by its lifting bracket or by means of a forklift truck if the pump is on a pallet. Never lift the pump by the motor cable or the hose/pipe.*

### 3. Identification

#### Nameplate, LC 220

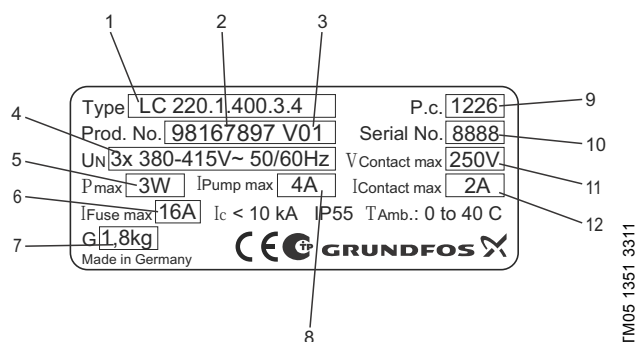


Fig. 1 Nameplate, LC 220

| Pos. | Description                  |
|------|------------------------------|
| 1    | Type designation             |
| 2    | Product number               |
| 3    | Version number               |
| 4    | Rated voltage                |
| 5    | Power consumption            |
| 6    | Maximum back-up fuse         |
| 7    | Weight                       |
| 8    | Maximum pump input current   |
| 9    | Production year and week     |
| 10   | Serial number                |
| 11   | Maximum voltage at contactor |
| 12   | Maximum current at contactor |

#### Type key, LC 220

| Example                                | LC 220 | .1 | .230 | .1 | .8 |
|----------------------------------------|--------|----|------|----|----|
| LC 220 = controller type               |        |    |      |    |    |
| 1 = one-pump controller                |        |    |      |    |    |
| 2 = two-pump controller                |        |    |      |    |    |
| Voltage [V]                            |        |    |      |    |    |
| 1 = single-phase                       |        |    |      |    |    |
| 3 = three-phase                        |        |    |      |    |    |
| Maximum operating current per pump [A] |        |    |      |    |    |

#### Nameplate, LC 221



Fig. 2 Nameplate, LC 221

| Pos. | Description                               |
|------|-------------------------------------------|
| 1    | Type designation                          |
| 2    | Product number                            |
| 3    | Production code (year, week)              |
| 4    | Number of phases                          |
| 5    | Maximum pump input current                |
| 6    | Maximum voltage at potential-free contact |
| 7    | Maximum back-up fuse                      |
| 8    | Minimum ambient temperature               |
| 9    | Version                                   |
| 10   | Serial number                             |
| 11   | Rated voltage                             |
| 12   | Power consumption                         |
| 13   | Maximum current at potential-free contact |
| 14   | Weight                                    |
| 15   | Maximum ambient temperature               |
| 16   | Frequency                                 |

#### Type key, LC 221

| Example                       | LC 221 | .1 | .230 | .1 | .10 | .30 |
|-------------------------------|--------|----|------|----|-----|-----|
| LC 221 = controller type      |        |    |      |    |     |     |
| 1 = one-pump controller       |        |    |      |    |     |     |
| 2 = two-pump controller       |        |    |      |    |     |     |
| Voltage [V]                   |        |    |      |    |     |     |
| 1 = single-phase              |        |    |      |    |     |     |
| 3 = three-phase               |        |    |      |    |     |     |
| Maximum operating current [A] |        |    |      |    |     |     |
| Capacitors [μF]               |        |    |      |    |     |     |
| Starting method:              |        |    |      |    |     |     |
| [ ] = DOL                     |        |    |      |    |     |     |
| SD = Star-delta               |        |    |      |    |     |     |

## 4. Maintenance



### Warning

**Before carrying out maintenance and service on lifting stations used for pumping liquids which might be hazardous to health, make sure that the lifting station has been thoroughly flushed with clean water and that the discharge pipe has been drained. Rinse the parts in water after dismantling. Make sure that the isolating valves have been closed. The work must be carried out in accordance with local regulations.**



### Warning

**Before making any connections in LC 220 or LC 221 or working on lifting stations, make sure that the power supply has been switched off and that it cannot be accidentally switched on.**

The periodic checks of the lifting station below should be carried out by authorised personnel and must, among other things, comprise electrical and mechanical maintenance.

### 4.1 Electrical maintenance

- Check the gaskets of the LC 220 and LC 221 cabinet front and those of the PG cable entries.
- Check the cable entries. Make sure that the cable entries are watertight and that the cables are not bent sharply and/or pinched.
- Check the controller functions.
- Check and clean the level sensor. Check its functions, e.g. using a bucket full of water. Check the winding resistance.
- If the LC 220 or LC 221 has been installed in a particularly aggressive environment, it is advisable to check the contacts of the motor starter, if installed, in order to identify possible chemical attack resulting in corrosion. In typical installations, the motor starter contacts will work for several years and do not require any inspection.

**Note:** The above list is *not* exhaustive. LC 220 or LC 221 may be installed in environments which require more thorough and regular maintenance.

### 4.2 Cleaning the pressure tube of the sensor

1. Push the ON-OFF-AUTO selector switch to "OFF" on the LC 220/221 control panel.
2. Multilift: Loosen the screw cap by turning it counterclockwise. Uno-/Duolift: Pull-out the pressure tube.
3. Lift the pressure tube carefully out of the collecting tank. Do not lift it by means of the hose.
4. Check for possible deposits on or in the pressure tube and underneath the screw cap.
5. Scrape off any deposits. If necessary, remove the hose from the controller and rinse the tube and hose with clean water at low pressure.
6. Refit the pressure tube by screwing the screw cap onto the tank. Reconnect the hose to the controller.
7. Check the sensor by running a test.

## 5. General service information

### 5.1 Please read this before replacing anything

Before replacing the piezoresistive sensor or main PC board, make sure that a replacement is really necessary. These parts are highly reliable and usually do not fail.

Unusual behaviour of the lifting station can often be attributable to loss of pressure.

Before replacing anything, check for possible leaks between pressure hose and bulkhead connector in the controller cabinet. The pressure hose must be inserted to the stop (approx. 15 mm).

Please note that the level shown in the display may not show 0 mm, although the tank is completely emptied. This fact is related to the measuring principles of the sensor.

As long as the pressure tube is not immersed in water, the starting value - which is equal to the distance between the bottom of the tank and the bottom edge of the tube (e.g. 84 mm) - will be displayed.

The sensor will start working correctly when the pressure tube is immersed in water. When the pressure tube is immersed, the liquid will enter the tube just a few mm (as long as there is no air leakage). The water level in the tube will not follow the level in the tank because of the pressure ratio inside the tube.

**Always use an antistatic service kit when handling electronic components. This will prevent static electricity from damaging components.**

**When unprotected, the component must be placed on the antistatic cloth.**

Caution



ESD protection set (antistatic service kit)

### 5.2 Checking for pressure leakages

- Check the connection at the pressure tube cap, the pressure hose should fit properly without pull. A hose clamp is not required.
- Check the pressure hose between tank and controller for any damage, make sure it is not kinked.
- At the controller cabinet: Make sure the hose is inserted in the bulkhead connector up to the stop, approx. 15-18 mm.
- Make also sure that the hose is installed without pull and properly supported by a strain relief.
- Open the controller and check that the connections up to the pressure sensor are OK. Check that the pressure sensor board is fitted properly in the socket.

### 5.3 Before dismantling

- Switch off the electricity supply to the lifting station and the controller. It must be ensured that it cannot be accidentally switched on.
- Close the inlet isolating valve.

#### Before assembly

- Check all parts.

#### After assembly

- Open all isolating valves.
- Check all functions by filling the tank with water and starting the pump.

## 5.4 Replacement

### 5.4.1 Complete controller (LC 220 and LC 221)

The replacement controllers are supplied with the correct parameter settings, assuming that the correct service part has been ordered.

The settings to be made are the following:

- Entering the nominal value of the pump: go to menu [I\_02] in the controller. See also installation and operating instructions.
- Setting the DIP switches according to the setting of the old controller.

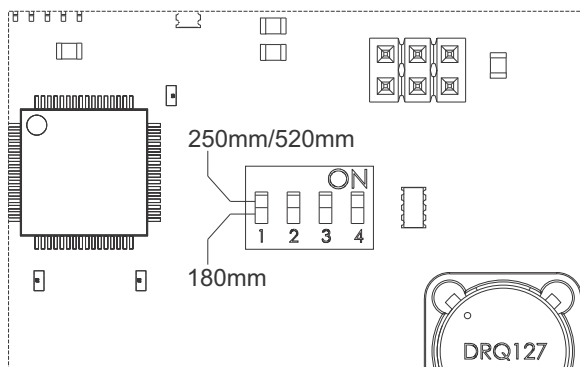


Fig. 3 DIP switches

### 5.4.2 Main board LC 220

The main board of the LC 220 controller is not a replaceable part, the complete controller must be exchanged instead.

### 5.4.3 Main board LC 221

Before replacing the main board, make these checks:

- Check if replacing the complete controller is an alternative (less time consuming).
- Check if you have an antistatic service kit available (ESD protection).
- Check if you have the following things available:
  - PC Tool LC 22x (software)
  - PC Tool Link (hardware)
  - laptop computer
  - installation and operating instructions PC Tool LC 22x.

Laptop computer and software are required to be able to install the correct parameter set.

#### Procedure

1. Switch off the power to the controller.



#### Warning

**Controllers for single-phase motors contain starting capacitors which store the mains voltage for a long time. Make sure the capacitors are discharged.**

2. Disconnect the cables and the pressure hose from the controller.
3. Remove the front cover and disconnect the communications cable between main board and display.
4. Mark all wires, then disconnect them from the main board.
5. Replace the old PC board with a new one, refit all cables and the pressure hose.
6. Connect the display but do not close the front cover yet.
7. Switch on the power to the controller.
8. Connect the TTL cable to the LC controller.

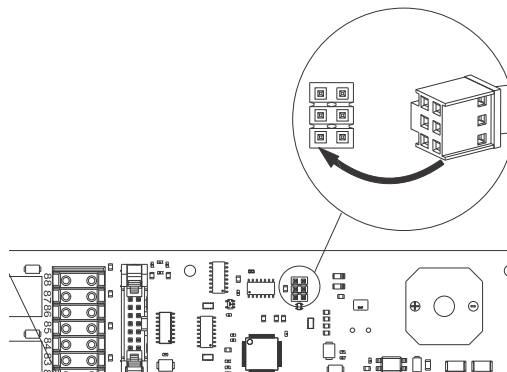


Fig. 4 Connecting the TTL cable to LC controller

9. Connect the TTL cable to PC Tool Link.

#### Note

**For further information please refer to installation and operating instructions PC Tool LC 22x.**

10. In the PC Tool, load the correct parameter set from the "Standard" archive and save the settings to the controller.

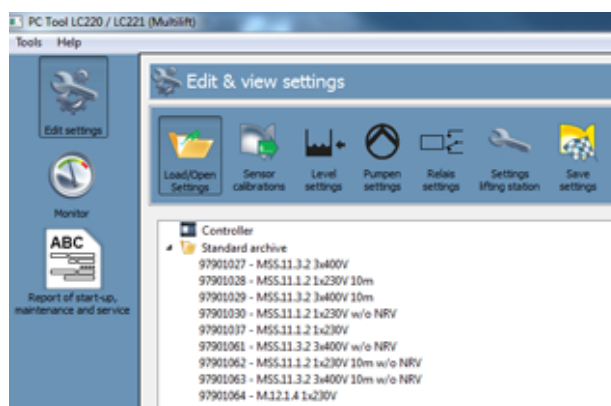


Fig. 5 PC tool

11. When uploading the parameter set is done, remove the interface cable, close the front cover and restart the controller.
12. Perform a calibration of the level sensor as described in section 5.4.5 Replacement of level sensor.
13. The controller is now ready for use. Fill the tank with water and verify that the lifting station is working correctly.

### 5.4.4 LC 221 replacement of display

1. Switch off the power to the controller.



#### Warning

**Controllers for single-phase motors contain starting capacitors which store the mains voltage for a long time. Make sure the capacitors are discharged.**

2. Remove the front cover of the controller.
3. Remove the communications cable from the display board.
4. Remove the six holding-down screws with a screwdriver.
5. Replace the display board.
6. Insert the holding-down screws and tighten carefully.
7. Plug in the communications cable and close the cabinet.
8. Switch on the power to the controller.

TM05 4716 2512

TM05 9360 3713

TM05 9744 4413

### 5.4.5 Replacement of level sensor

#### Removing the piezoresistive sensor

When removing the piezoresistive sensor, be very careful not to bend or break the legs of the sensor. Use a small pair of pliers to squeeze the plastic fixation pins, (see fig. 6), and lift up the piezoresistive sensor (see fig. 7).

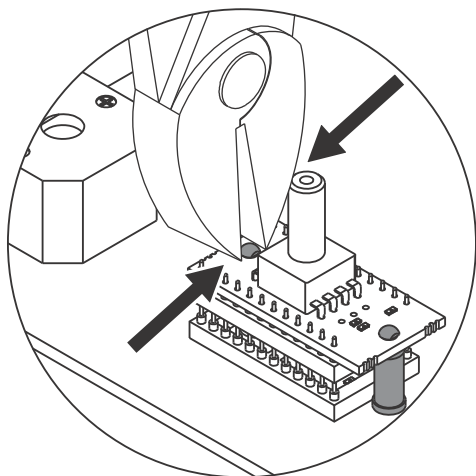


**Fig. 6** Squeezing the fixation pins of the piezoresistive sensor

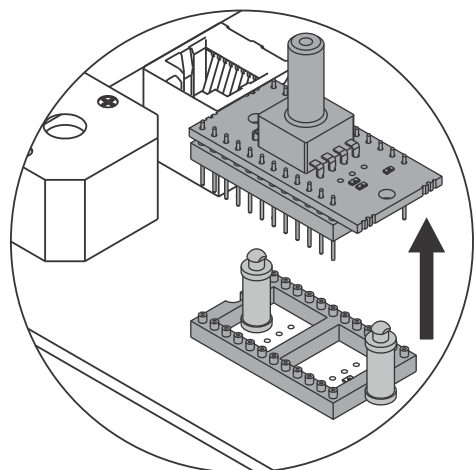


**Fig. 7** Removing the piezoresistive sensor from LC 220

#### Mounting the piezoresistive sensor

**Always use an antistatic service kit when handling electronic components. This will prevent static electricity from damaging components. See fig. 4.**

**Caution**

**When unprotected, the component must be placed on the antistatic cloth.**

When mounting the piezoresistive sensor, make sure to place the sensor correctly on the IC connector according to the plastic fixation pins.

Press down firmly to make sure the sensor is fitted correctly.

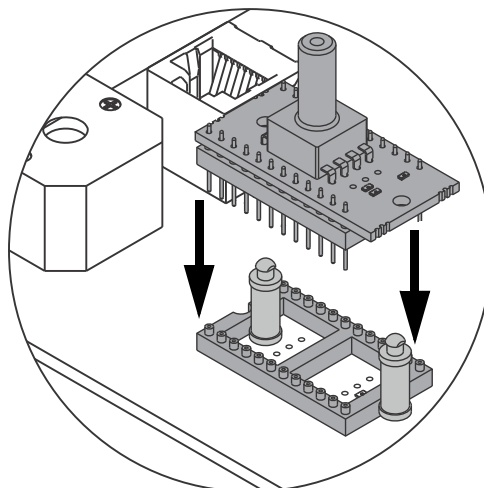


**Fig. 8** Mounting the piezoresistive sensor on the LC 220 main board

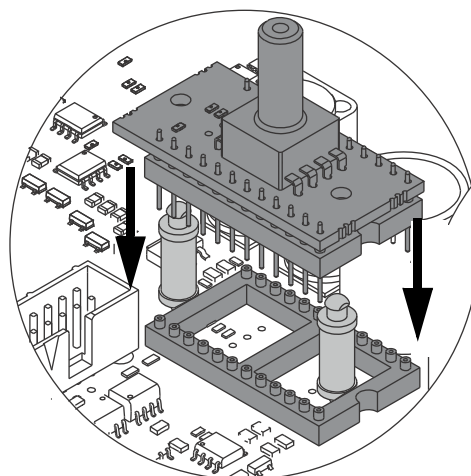


**Fig. 9** Mounting the piezoresistive sensor on the LC 221 main board

TM05 7442 1013

TM05 7443 1013

TM05 7443 1013

TM05 7441 1013

## 5.5 Settings

### 5.5.1 Calibration of level sensor

#### LC 220

1. Set the ON-OFF-AUTO selector switch to "OFF".
2. Remove the pressure tube from the tank so that the air pressure on the piezoresistive sensor is normal atmospheric pressure.
3. Set DIP switch no. 4 to "OFF" - **wait 5 seconds**.
4. Set DIP switch no. 4 to "ON".
5. The sensor is now reset and calibrated.

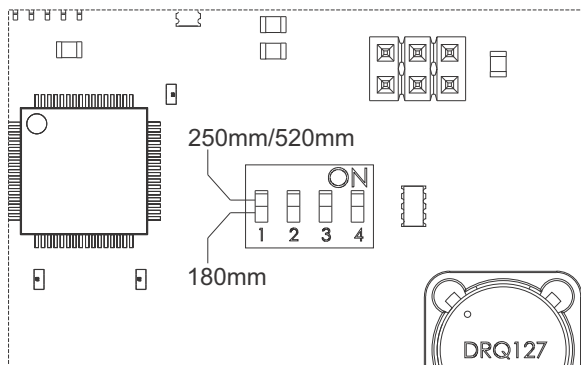


Fig. 10 LC 220, DIP switch

#### LC 221

The calibration can be done by using a bucket of water and the pressure tube.

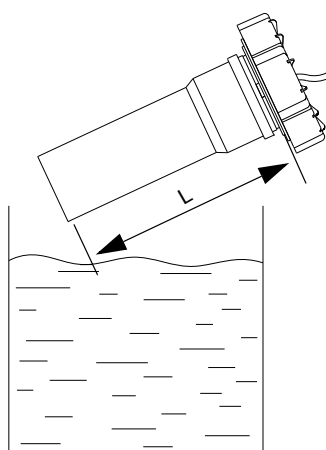


Fig. 11 Pressure tube length

1. Set the ON-OFF-AUTO selector switch to "OFF".
2. Lift the pressure tube out of the tank.
3. In the setup menu of the LC 221 controller, go to calibration menu point C\_01 and press "OK" (please also refer to the installation and operating instructions).
4. Enter into the PC Tool program the length [L] (mm) of the pressure tube according to the list below and press "OK". See fig. 11.

| Product | M/MD | MD1 | MLD | MOG/MDG | MD1/MDV |
|---------|------|-----|-----|---------|---------|
| L [mm]  | 413  | 326 | 628 | 388     | 628     |

5. Fill a bucket or equivalent with water. The higher the water level, the better, as the calibration will be more precise.
6. Make a mark on the pressure tube below the top level, and enter in the PC Tool program the distance [X] (mm) from the top down to the mark. Immerse the pressure tube into the water. The deeper the tube is in the water, the better the calibration. See fig. 12.

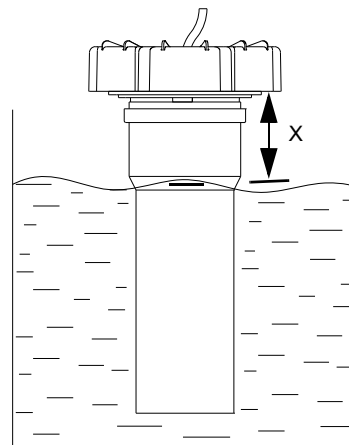


Fig. 12 Piezoresistive sensor calibration

7. Lower the pressure tube into the water until the water surface reaches the painted mark. Press "OK" in the display while keeping the pressure tube steady in the water. The sensor has now been calibrated. The starting value can be checked by measuring the distance between the bottom of the tank and the bottom edge of the tube.

**Note** The longer the distance is between the "zero point" and the simulated "max. level", the more precise the measurement will be.

## 5.6 Checks

### 5.6.1 Checking the level sensor

The sensor can be checked with a voltmeter between ( $V_{out}$ ) and (GND).

The voltage may vary from 0.2 to 4.9 V, depending on the amount of water inside the tank, where 0.2 V equals atmospheric pressure.

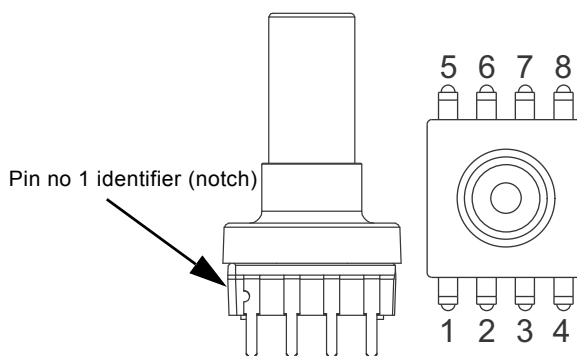


Fig. 13 Piezoresistive sensor

| Pin no. | 1   | 2     | 3   | 4         | 5   | 6   | 7   | 8   |
|---------|-----|-------|-----|-----------|-----|-----|-----|-----|
| Type    | N/C | $V_s$ | GND | $V_{out}$ | N/C | N/C | N/C | N/C |

TM05 4486 2312

TM05 9360 3713

TM05 4487 2312

TM05 7034 0413

## 6. Fault finding



### Warning

*Before carrying out maintenance and service on lifting stations used for pumping liquids which might be hazardous to health, make sure that the lifting station has been thoroughly flushed with clean water and that the discharge pipe has been drained. Rinse the parts in water after dismantling. Make sure that the isolating valves have been closed. The work must be carried out in accordance with local regulations.*



### Warning

*Before making any connections in the LC 220 or LC 221 or working on lifting stations, make sure that the power supply has been switched off and that it cannot be accidentally switched on.*

### 6.1 Fault finding of LC 220

#### Emergency operating mode by controller:

To prevent the pump from overheating, a runtime limitation will stop the pump after 60 seconds of operation to cool down for 600 seconds before starting up again. These cycles will continue as long as the water level is higher than the stop level. The times are according to intermittent operation S3 10 %, 1 min.

**Note:** Normal operating time for MSS is max. 8 seconds.

#### Motor protection inside the motor:

Single- and three-phase motors are protected by a thermal switch in the windings and an additional thermal circuit breaker to cut out the motor in case of overload.

| Fault                                                                                                | LED indication                                                                                                                       | Cause                                                                                                       | Remedy                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Pump does not run in AUTO mode, and the water level is rising                                     | Green power LED is on.<br>Red pump LED is on.                                                                                        | The thermal switch has cut out the pump.                                                                    | Allow the pump to cool down.<br>After cooling down, the pump will restart automatically, unless LC 220 has been set to manual restarting. If so, shift the ON-OFF-AUTO selector switch to position OFF (O) for a short period.                                                                                                                                                                        |
|                                                                                                      | Green power LED is on.                                                                                                               | The level measurement fails, the sensor gives wrong signal.                                                 | Check for possible leaks between pressure hose and bulkhead connector at the controller cabinet. See section <a href="#">5.6.1 Checking the level sensor</a> .                                                                                                                                                                                                                                        |
|                                                                                                      | -                                                                                                                                    | Defective main board                                                                                        | Replace controller.                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                      | Green power LED is on.                                                                                                               | The new DIP switch setting does not work correctly.                                                         | Switch off the power supply to the controller for 1 minute and switch it on again.                                                                                                                                                                                                                                                                                                                    |
|                                                                                                      | Green pump symbol LED is ON and is red (flashing) or gets red after 60 seconds (buzzer is active).                                   | Thermal switch inside the motor has stopped the pump.                                                       | Switch to OFF mode and wait 10 minutes until the pump has cooled down. Then try to empty the tank again in AUTO mode. Measure motor winding resistances.                                                                                                                                                                                                                                              |
| 2. Pump operates in intervals with starts and stops.                                                 | Phase sequence failure light is ON (long time after setup at installation).                                                          | The phase sequence of the mains supply was changed. Check if any electrical installation was recently made. | Change phase sequence of CEE plug (see fig. 14) or of mains supply.                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                      | Pump operates approx. 1 minute and stops for some minutes (red LED is flashing, buzzer is active), operates again (green LED is on). | Emergency operating mode by controller is active.                                                           | a) Check the ON-OFF-AUTO switch. If it is accidentally set to ON, the controller will prevent the pump from continuous operation.                                                                                                                                                                                                                                                                     |
|                                                                                                      |                                                                                                                                      |                                                                                                             | b) The discharge pipe is blocked. Check the non-return valve, the isolating valve and the pipework.                                                                                                                                                                                                                                                                                                   |
| 3. Pump does not run in ON mode.                                                                     | Phase sequence failure.                                                                                                              | Wrong phase sequence.                                                                                       | c) The pump housing vent is blocked. Check vent and remove blockage.                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                      |                                                                                                                                      |                                                                                                             | Change phase sequence of CEE plug or mains supply (see fig. 14).                                                                                                                                                                                                                                                                                                                                      |
| 4. Wastewater flows back to sanitary appliances. Pump always starts at a higher level than required. | Normal indications with no visible failure.                                                                                          | The starting level is higher than required.                                                                 | Check if the lowest starting level at 180 mm is correctly set: Check DIP switch setting. If the starting level of 180 mm is too high, it can be set to an absolute minimum of 150 mm using the PC Tool LC 22x (call Grundfos Service). If this level is still too high, check the installation of the sanitary appliance and the use of a Sololift2 unit for the lowest sanitary appliance installed. |
| 5. Pump starts at different water levels or does not start regularly.                                | Normal indications with no visible failure.                                                                                          | DIP switch 4 is in calibration position OFF.                                                                | Check DIP switch 4 and change setting to ON position.<br><b>IMPORTANT:</b> When changing the DIP switch to ON position, the pressure tube inside the tank must not be submerged. Otherwise the calibration will fail.                                                                                                                                                                                 |

| <b>Fault</b>                                                        | <b>LED indication</b>                             | <b>Cause</b>                                                                                                                      | <b>Remedy</b>                                                                                                                                                       |
|---------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. Recurrent acoustic alarm.                                        | No fault is indicated.                            | Most alarms (e.g. high water, sensor) are reset automatically when controller is in automatic reset mode (DIP switch 2).          | Automatically reset faults can only be read out by the PC Tool LC 22x.                                                                                              |
| 7. No pump operation.<br>Acoustic alarm and switch symbols are ON.  | Red switch symbol LED is ON and buzzer is active. | An external switch (e.g. high water level switch as flooding indication or another switch) outside the lifting station is closed. | Check the installation around the lifting station and any flooding protection switches connected to the controller.                                                 |
| 8. The pump starts and stops too often, even if there is no inflow. |                                                   | The level measurement fails, the sensor gives wrong signal.                                                                       | Check for possible leaks between pressure hose and bulkhead connector at the controller cabinet. The pressure hose must be inserted up to the stop (approx. 15 mm). |
| 9. The pump starts sometimes without apparent reason.               |                                                   | Test run 24 hours after last operation.                                                                                           | No action necessary. It is a safety function preventing the shaft seal from seizing up.                                                                             |
| 10. From time to time the pump runs longer than usual               |                                                   | Every tenth time the pump runs two seconds longer.                                                                                | No action necessary. It is a feature of the LC 220 / 221 controllers letting the pumps run longer to ensure that the pressure tube is emptied.                      |

## 6.2 Fault finding of LC 221

| Fault                                                             | Indication at display                                                                                                                                                                                | Cause                                                                                                                                            | Remedy                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Pump does not run in AUTO mode, and the water level is rising. | LCD is dark, no symbol and no LED is ON.                                                                                                                                                             | The power supply cable is broken, or loose contact.                                                                                              | Check power supply cable and terminal block inside controller.                                                                                                                                                                                                                                                                                                                 |
|                                                                   | LCD is dark, no symbol and no LED is ON.                                                                                                                                                             | Control circuit fuses are blown.                                                                                                                 | Replace blown fuses.                                                                                                                                                                                                                                                                                                                                                           |
|                                                                   | LCD is dark, no symbol and no LED is ON, but the buzzer is active.                                                                                                                                   | LCD board or cable with RJ45 plug is defective.                                                                                                  | Replace LCD board or check cable (with RJ45 plugs).                                                                                                                                                                                                                                                                                                                            |
|                                                                   | <ul style="list-style-type: none"> <li>– Green power symbol LED is on.</li> <li>– Water level on display does not correspond to level in tank.</li> <li>– No pump operation is indicated.</li> </ul> | The level measurement fails.                                                                                                                     | Check for possible leaks between pressure hose and bulkhead connector at the controller cabinet. See section <a href="#">5.6.1 Checking the level sensor</a> .                                                                                                                                                                                                                 |
|                                                                   | <ul style="list-style-type: none"> <li>– Green power symbol LED is on.</li> <li>– Water level on display corresponds to level in tank.</li> <li>– No pump operation is indicated.</li> </ul>         | Wrong setting for maximum level.                                                                                                                 | Correct sensor setting. See section <a href="#">5.5.1 Calibration of level sensor</a> .                                                                                                                                                                                                                                                                                        |
|                                                                   | <ul style="list-style-type: none"> <li>– Pump symbol(s) flashing.</li> <li>– Buzzer is active.</li> <li>– <b>TEMP</b> is displayed.</li> <li>– Thermal switch symbol displayed.</li> </ul>           | Thermal switch inside the motor has stopped the pump.                                                                                            | Switch to OFF mode and wait 10 minutes until the pump has cooled down. Then try to empty the tank again in AUTO mode. Measure motor winding resistances.                                                                                                                                                                                                                       |
|                                                                   | <ul style="list-style-type: none"> <li>– Pump symbol(s) flashing.</li> <li>– <b>F007..F008</b> displayed or</li> <li>– <b>RELAY</b> displayed.</li> </ul>                                            | Pump overcurrent because of blockage or worn/defective impeller.                                                                                 | <ul style="list-style-type: none"> <li>– Remove blockage.</li> <li>– Check pump.</li> </ul>                                                                                                                                                                                                                                                                                    |
|                                                                   | Phase sequence failure light is ON (long time after setup at installation).                                                                                                                          | The phase sequence of the mains supply was changed, or a phase is missing. Check if any change at the electrical installation was made recently. | <ul style="list-style-type: none"> <li>– Check for changes of electrical installation.</li> <li>– Change phase sequence of CEE plug or mains supply (see fig. <a href="#">14</a>).</li> </ul>                                                                                                                                                                                  |
|                                                                   | SENSOR, F005 or F006                                                                                                                                                                                 |                                                                                                                                                  | Check for possible leaks between pressure hose and bulkhead connector at the controller cabinet. The pressure hose must be inserted up to the stop (approx. 15 mm).                                                                                                                                                                                                            |
|                                                                   | 2. Pump operates in intervals being started (one minute) and stopped (several minutes) and then operates again.                                                                                      | Pump fault is indicated at LCD and buzzer is active.                                                                                             | Emergency operating mode by controller is active.                                                                                                                                                                                                                                                                                                                              |
|                                                                   |                                                                                                                                                                                                      |                                                                                                                                                  | <ul style="list-style-type: none"> <li>a) Check the ON-OFF-AUTO switch. If it is accidentally set to ON, the controller will prevent the pump from continuous operation.</li> <li>b) The discharge pipe is blocked. Check the non-return valve, the isolating valve and the pipework.</li> <li>c) The pump housing vent is blocked. Check vent and remove blockage.</li> </ul> |

| Fault                                                                                                | Indication at display                            | Cause                                                                                                                                                                                                                                                                                                                                                      | Remedy                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. The pump starts and stops too often, even if there is no inflow.                                  |                                                  | The level measurement fails, the sensor gives wrong signal.                                                                                                                                                                                                                                                                                                | Check for possible leaks between pressure hose and bulkhead connector at the controller cabinet. See section <a href="#">5.6.1 Checking the level sensor</a> .                                                                                                                                                         |
|                                                                                                      | F011 and/or F012 pump and time symbols flashing  | The operating time protection is activated. If the pump runs for longer than 3 minutes, a protection program of the controller will stop the pump for 3 minutes and the other pump will take over. At the next start impulse, the first pump will be activated again. If the venting problem persists, the pump will be stopped after 3 minutes and so on. | Check that the discharge valve is completely opened. Check the pump housing vent. If blocked, clean the vent hole.                                                                                                                                                                                                     |
|                                                                                                      | TEMP F005 and/or F006                            | The thermal switch has cut out the pump                                                                                                                                                                                                                                                                                                                    | Allow the pump to cool down. After cooling down, the pump will restart automatically, unless LC 221 has been set to manual restarting. Check the inflow parameters and the non-return valve. A high number of starts without cooling time in between over a longer period can cause thermal cut-out. Consider S3 duty. |
| 4. The pump starts sometimes without apparent reason.                                                | Normal indications with no visible failure.      | Test run 24 hours after last operation.                                                                                                                                                                                                                                                                                                                    | No action necessary. It is a safety function that prevents the shaft seal from seizing up.                                                                                                                                                                                                                             |
| 5. From time to time the pump runs longer than usual.                                                | Normal indications with no visible failure.      | Safety feature of the controller. Every tenth time the pump runs two seconds longer to remove all liquid from the pressure tube.                                                                                                                                                                                                                           | No action necessary.                                                                                                                                                                                                                                                                                                   |
| 6. Wastewater flows back to sanitary appliances. Pump always starts at a higher level than required. | Normal indications with no visible failure.      | The start level is higher than required.                                                                                                                                                                                                                                                                                                                   | Check if the lowest start level is correctly set. If not, correct setting.                                                                                                                                                                                                                                             |
| 7. The pump operating time exceeds time from last observation ( $8 < x < 60$ sec.).                  | Normal indications with no visible failure.      | Pump housing vent may be blocked. Pump start is delayed.                                                                                                                                                                                                                                                                                                   | a) Remove the (partially) blocked pump housing vent.                                                                                                                                                                                                                                                                   |
|                                                                                                      |                                                  |                                                                                                                                                                                                                                                                                                                                                            | b) Check pump hydraulics for partial blockage.                                                                                                                                                                                                                                                                         |
| 8. Recurrent acoustic alarm.                                                                         | At observation, no failure is indicated.         | Most alarms (e.g. high water, sensor) are reset automatically when in automatic reset mode (A_01).                                                                                                                                                                                                                                                         | The last 20 faults are stored in the fault log.                                                                                                                                                                                                                                                                        |
| 9. No pump operation. Acoustic alarm is indicated.                                                   | <b>EXTERN</b> is displayed and buzzer is active. | An external switch (e.g. high water level switch as flooding indication or another switch) outside the lifting station is closed.                                                                                                                                                                                                                          | Check the installation around the lifting station and any flooding protection switches connected to the controller.                                                                                                                                                                                                    |
| 10. No pump operation. Acoustic alarm is indicated.                                                  | <b>SENSOR</b> is displayed (fault code F004).    | The level measurement fails, the sensor gives wrong signal.                                                                                                                                                                                                                                                                                                | Check the sensor setting and/or voltages and replace sensor if necessary. See section <a href="#">5.6 Checks</a> .                                                                                                                                                                                                     |

## 7. Wiring diagrams

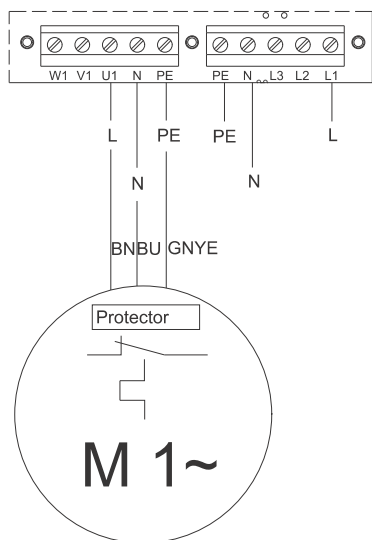


Fig. 14 Wiring diagram, single-phase Multilift MSS

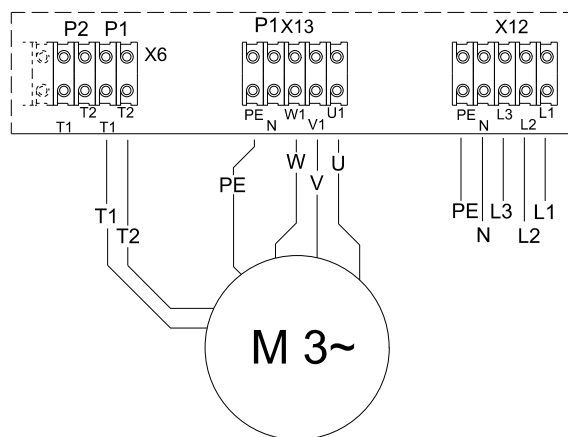


Fig. 17 Wiring diagram, three-phase Multilift M.12.3.4 and M.15.3.4

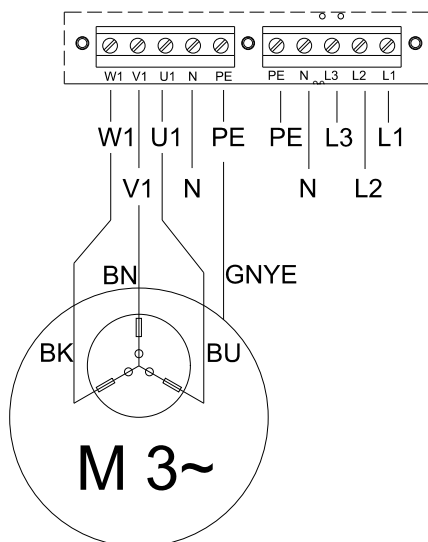


Fig. 15 Wiring diagram, three-phase Multilift MSS

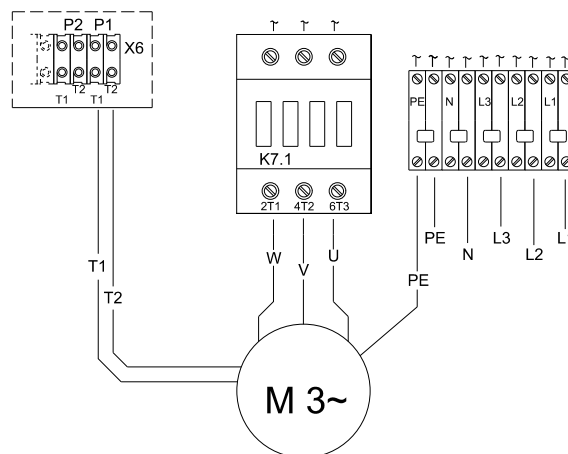


Fig. 18 Wiring diagram, three-phase Multilift M.22.3.4 with contactors

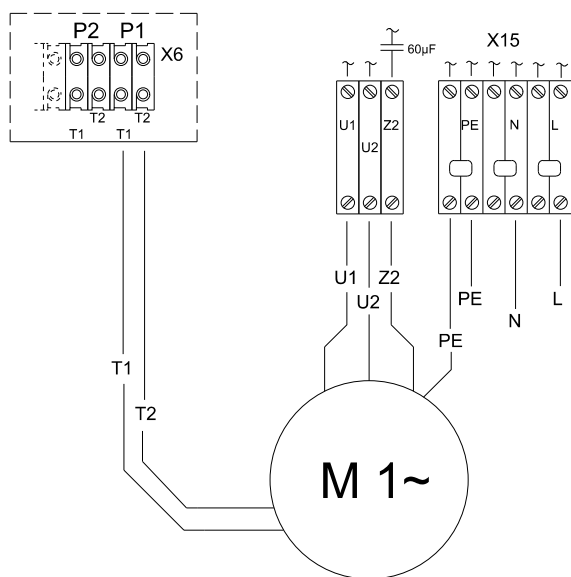


Fig. 16 Wiring diagram, single-phase Multilift M.12.1.4 and M.15.1.4

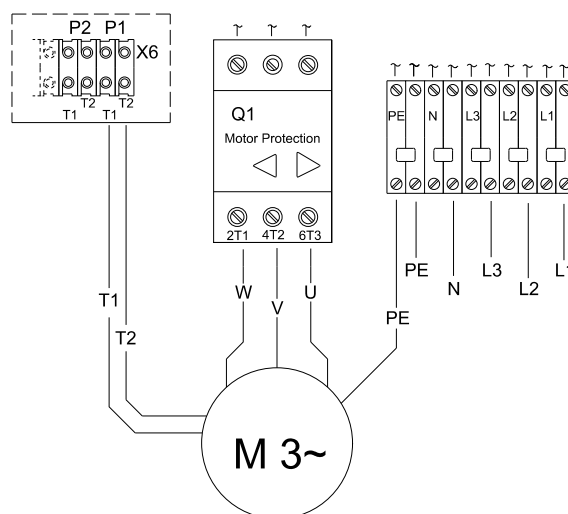
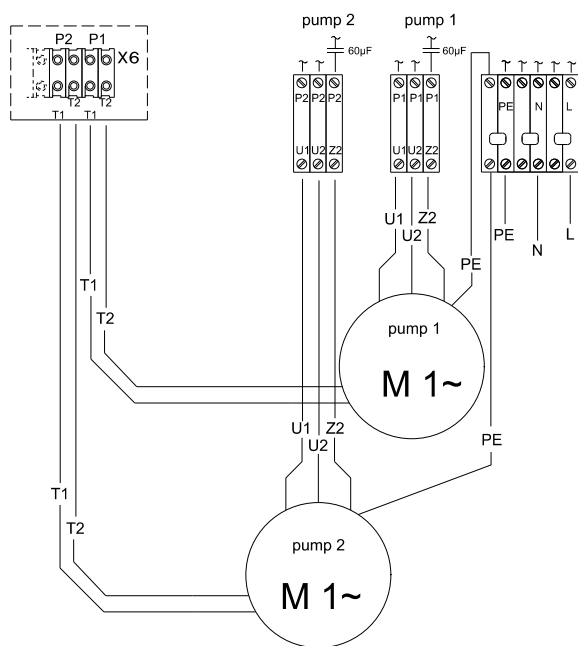
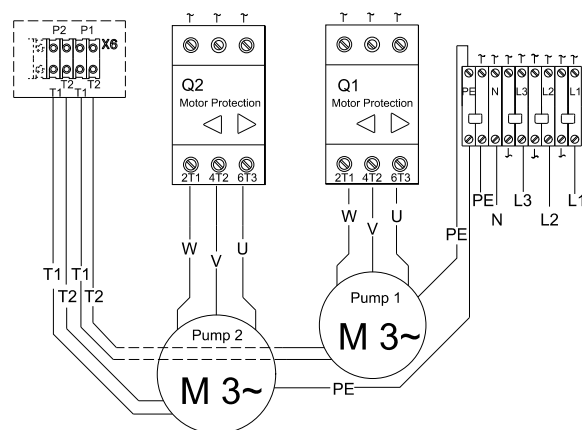


Fig. 19 Wiring diagram, three-phase Multilift M.22.3.4, M.24.3.2, M.32.3.2 and M.38.3.2 with motor-protective circuit breaker



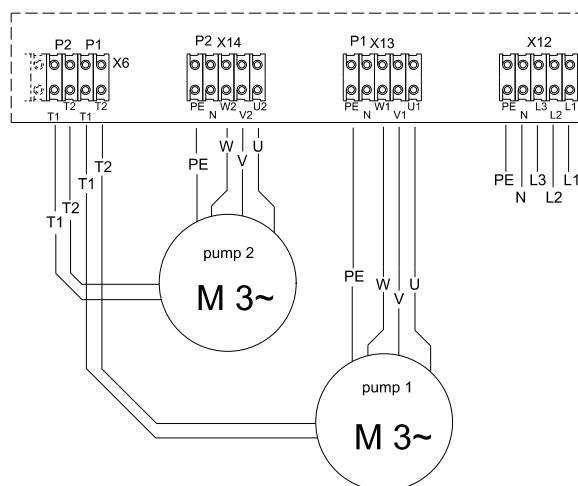
TM05 3593 1612

**Fig. 20** Wiring diagram, single-phase Multilift MD/MLD.12.1.4 and MD/MLD.15.1.4



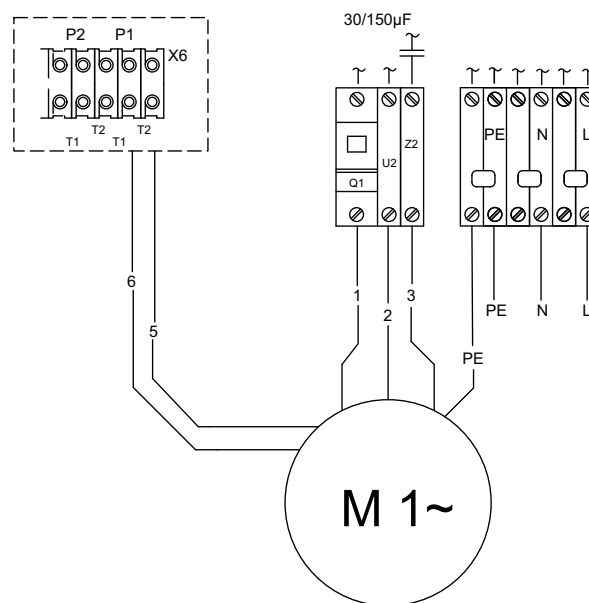
TM05 3596 1612

**Fig. 23** Wiring diagram, three-phase Multilift MD/MLD.24.3.2, MD/MLD.32.3.2 and MD/MLD.38.3.2 with motor-protective circuit breaker



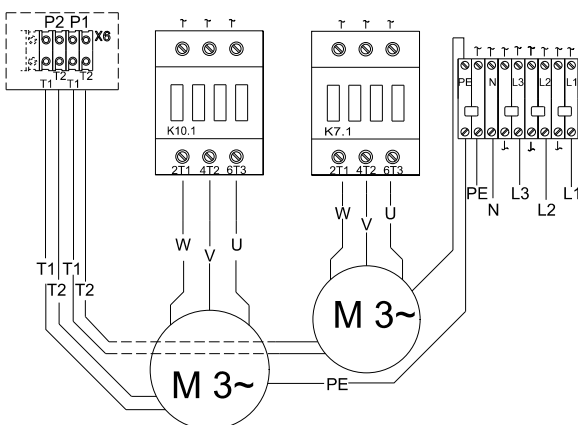
TM05 3594 1612

**Fig. 21** Wiring diagram, three-phase Multilift MD/MLD.12.3.4 and MD/MLD.15.3.4



TM05 3819 1612

**Fig. 24** Wiring diagram, single-phase Multilift MOG



TM05 3595 1612

**Fig. 22** Wiring diagram, three-phase Multilift MD/MLD.22.3.4 with contactors

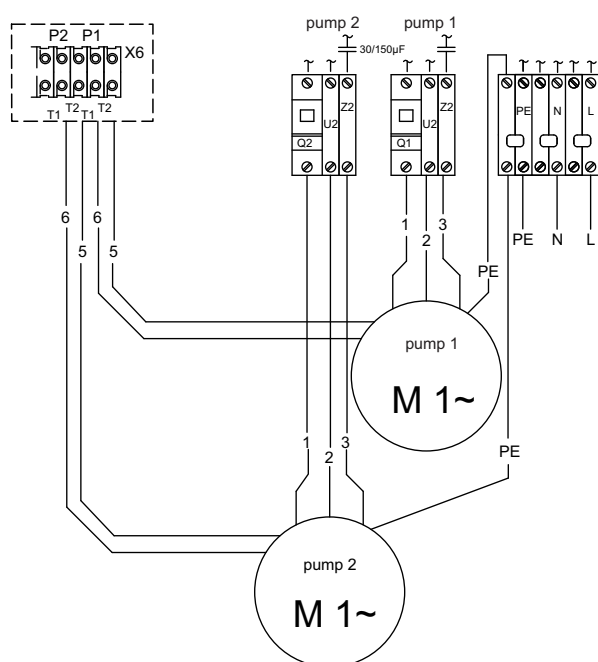


Fig. 25 Wiring diagram, single-phase Multilift MDG

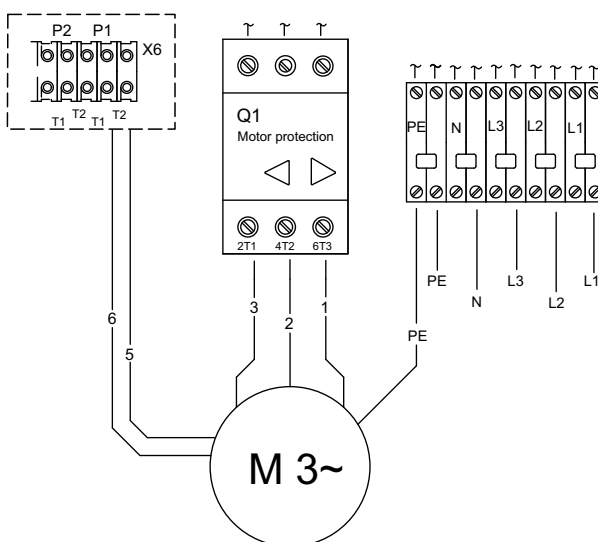


Fig. 26 Wiring diagram, three-phase Multilift MOG

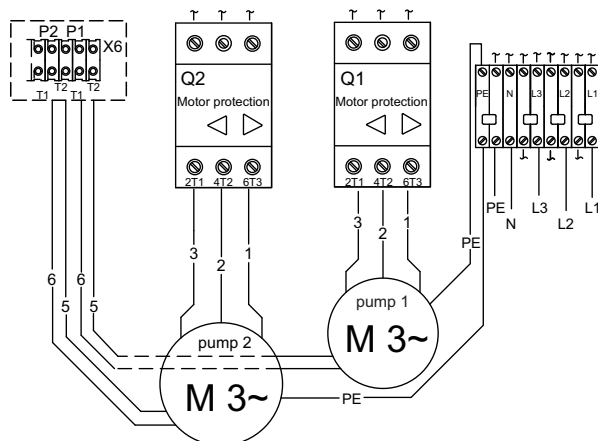


Fig. 27 Wiring diagram, three-phase Multilift MDG

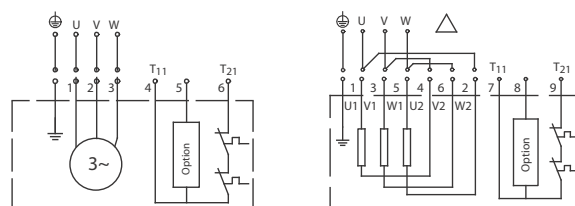
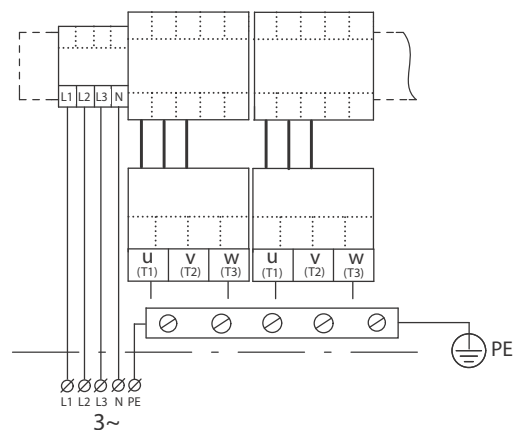


Fig. 28 Wiring diagram, three-phase DOL (&lt; 5 kW) for Multilift MD1 and MDV

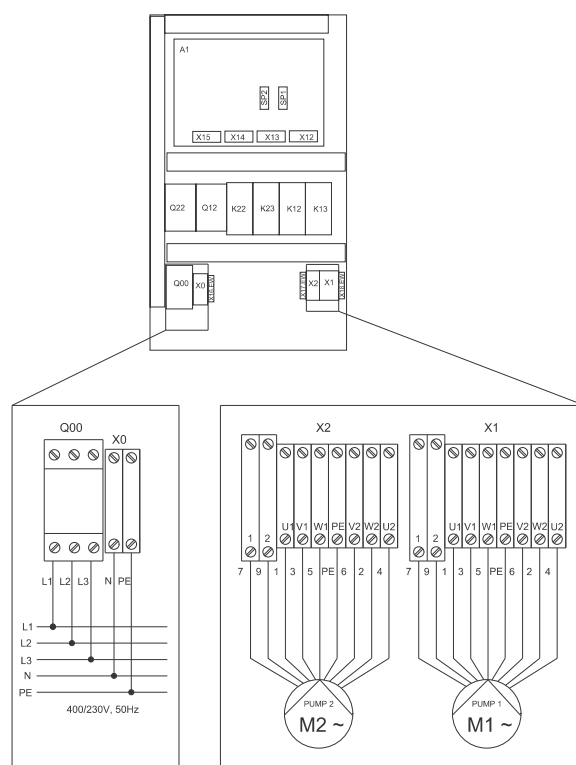


Fig. 29 Wiring diagram, three-phase Y/D (&gt; 5 kW) for Multilift MD1 and MDV

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